CLAIMS

We claim:

1. A process for charging a metal hydride bed, comprising:
providing a first container in first flow communication with a second container;
providing a chemical hydride slurry in said first container;
providing said metal hydride bed in said second container, said metal hydride bed comprising a hydrogen storage material, said first flow communication flowing slurry from said first container to said second container;
contacting said slurry with said metal hydride bed in said second container, said contacting promoting a reaction between in said slurry, said reaction producing atomic hydrogen and byproducts, wherein at least a portion of said atomic hydrogen is absorbed and stored by said metal hydride bed.

2. The process of Claim 1, said chemical hydride slurry comprising:
a metal hydride;
a stabilizing agent; and
water.

3. The process of Claim 1, said contacting comprising pumping said slurry from said first container to said second container.

4. The process of Claim 3, further comprising pumping said slurry and said byproducts from said second container into said first container through a second flow communication between said first container and said second container.

5. The process of Claim 4, further comprising pumping said slurry from said first container to said second container until said slurry is free of hydrogen.

6. The process of Claim 2, said metal hydride of said slurry comprising sodium borohydride, potassium borohydride, lithium borohydride or a mixture thereof.

7. The process of Claim 2, said stabilizing agent comprising sodium hydroxide, potassium hydroxide, lithium hydroxide or a mixture thereof.

8. The process of Claim 1, said hydrogen storage material comprising an alloy selected from AB, A_2B, AB_2 or AB_5.

9. The process of Claim 1, said hydrogen storage material comprising Mg based alloys, Mg-Ni based alloys, Mg-Cu based alloys, Ti-Fe based alloys, Ti-Ni based alloys, Mm-Co based alloys, Ti-Mn based alloys, Ti-V based alloys, Ti-Cr based alloys, Mm-Ni based alloys or mixtures thereof.

10. The process of Claim 1, said hydrogen storage material comprising a $Ti_{Q-Z}Zr_XMn_{Z-Y}A_Y$ alloy, wherein A comprises at least one of V, Cr, Fe, Ni or Al, wherein Q is between 0.9 and 1.1, X is between 0.0 and 0.35, Y is between 0.6 and 1.8, Z is between 1.8 and 2.1.

11. The process of Claim 1, further comprising venting unabsorbed hydrogen.

12. The process of Claim 1, further comprising forcing unabsorbed hydrogen to a hydrogen powered apparatus, said apparatus comprising a fuel cell.

13. The process of Claim 5, further comprising closing a valve set in first flow communication when said slurry is free of hydrogen.

14. A chemical hydride bed charging system, comprising:
a chemical hydride slurry;
a first container containing said chemical hydride slurry; and
a second container containing said metal hydride bed, said first container in first flow communication with said second container, said first flow communication flowing slurry from said first container to said second container and said metal hydride bed promoting a reaction between in said

slurry, said reaction producing atomic hydrogen and byproducts, wherein at least a portion of said atomic hydrogen is absorbed by said metal hydride bed.

15. The system of Claim 14, said chemical hydride slurry comprising

a metal hydride,

a stabilizing agent; and

water;

16. The system of Claim 15, said reaction comprising a reaction between said metal hydride and said water.

17. The system of claim 14, further comprising a valve, said valve controlling flow from said first container to said second container.

18. The system of Claim 14, further comprising a pump, said pump forcing second flow communication between said first container and said second container, said second flow communication flowing byproducts and slurry from said second container to said first container.

19. The system of Claim 15, said metal hydride of said slurry comprising sodium borohydride, potassium borohydride, lithium borohydride or a mixture thereof.

20. The system of Claim 15, said stabilizing agent comprising sodium hydroxide, potassium hydroxide, lithium hydroxide or a mixture thereof.

21. The system of Claim 15, said metal hydride bed comprising a hydrogen storage material, said hydrogen storage material comprising an alloy selected from AB, A_2B, AB_2, AB_5 or mixtures thereof.

22. The system of Claim 15, said metal hydride bed comprising a hydrogen storage material, said hydrogen storage material comprising Mg based alloys, Mg-Ni based

alloys, Mg-Cu based alloys, Ti-Fe based alloys, Ti-Ni based alloys, Mm-Co based alloys, Ti-Mn based alloys, Ti-V based alloys, Ti-Cr based alloys, Mm-Ni based alloys or mixtures thereof.

23. The system of Claim 15, said metal hydride bed comprising a hydrogen storage material, said hydrogen storage material comprising a $Ti_{Q-Z}Zr_XMn_{Z-Y}A_Y$ alloy, wherein A comprises at least one of V, Cr, Fe, Ni or Al, wherein Q is between 0.9 and 1.1, X is between 0.0 and 0.35, Y is between 0.6 and 1.8, Z is between 1.8 and 2.1.

24. The system of Claim 14, said metal hydride bed comprising:
a catalyst to promote said reaction; and
a hydrogen storage material to absorb atomic hydrogen.

25. The system of Claim 24, said hydrogen storage material comprising said catalyst.